

The Cryosphere Discuss., referee comment RC1
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Comment on tc-2021-251

Anonymous Referee #1

Referee comment on "Towards accurate quantification of ice content in permafrost of the Central Andes – Part 2: An upscaling strategy of geophysical measurements to the catchment scale at two study sites" by Tamara Mathys et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2021-251-RC1>, 2021

General comments:

The manuscript submitted by Mathys et al. describes a new method to extrapolate the quantification of ice contents in permafrost areas based on another paper submitted. By the combination of multiple observations, modelling tools, remote sensing data, they evaluated the ice contents in study sites in the Central Andes. This quantification is helpful for the scientific community to better understand hydrological processes occurring in permafrost-affected catchments.

I think the paper is suitable for publication in The Cryosphere with the condition that the paper explaining the methodology is published as this manuscript fully depends on Hiblich et al. paper. Moreover, I do have some specific comments that may improve the quality of the manuscript.

Specific comments:

Figure 2: It is hard to link the figure with what is described in the text. I would recommend adding some information on the figure to help the reader follow the different steps.

L143-145: I suggest to split the sentence into two separate sentences.

In this way, I found multiple long sentences in the manuscript and splitting them would

help the reader.

L223-225: "Figure 3, 1a,b" and "Figure 3, 2a,b" are hard to understand. Please clarify.

Figure 5: I do not see where the text refer to Figure 5. If it is not cited, it should be moved to the Appendix section or removed. Moreover, the figures and the tables within Figure 5 are hard to read.

L253-255: This should go in the Discussion section.

L312-313: Parentheses are doubled. Please correct.

L332-335: I would suggest to move this sentence to the discussion section.

L335-338: These results are already mentioned in the previous paragraph.

Figure 7: It is not clear that "rock glacier dominated catchment" cover the four groups above.

Figure 8: The large uncertainties in the calculations of ice content revealed by this figure are not enough discussed in the discussion section. I would recommend to add information regarding this uncertainty so the reader can understand how the method presented in this paper improves the quantification of ice contents in permafrost areas.